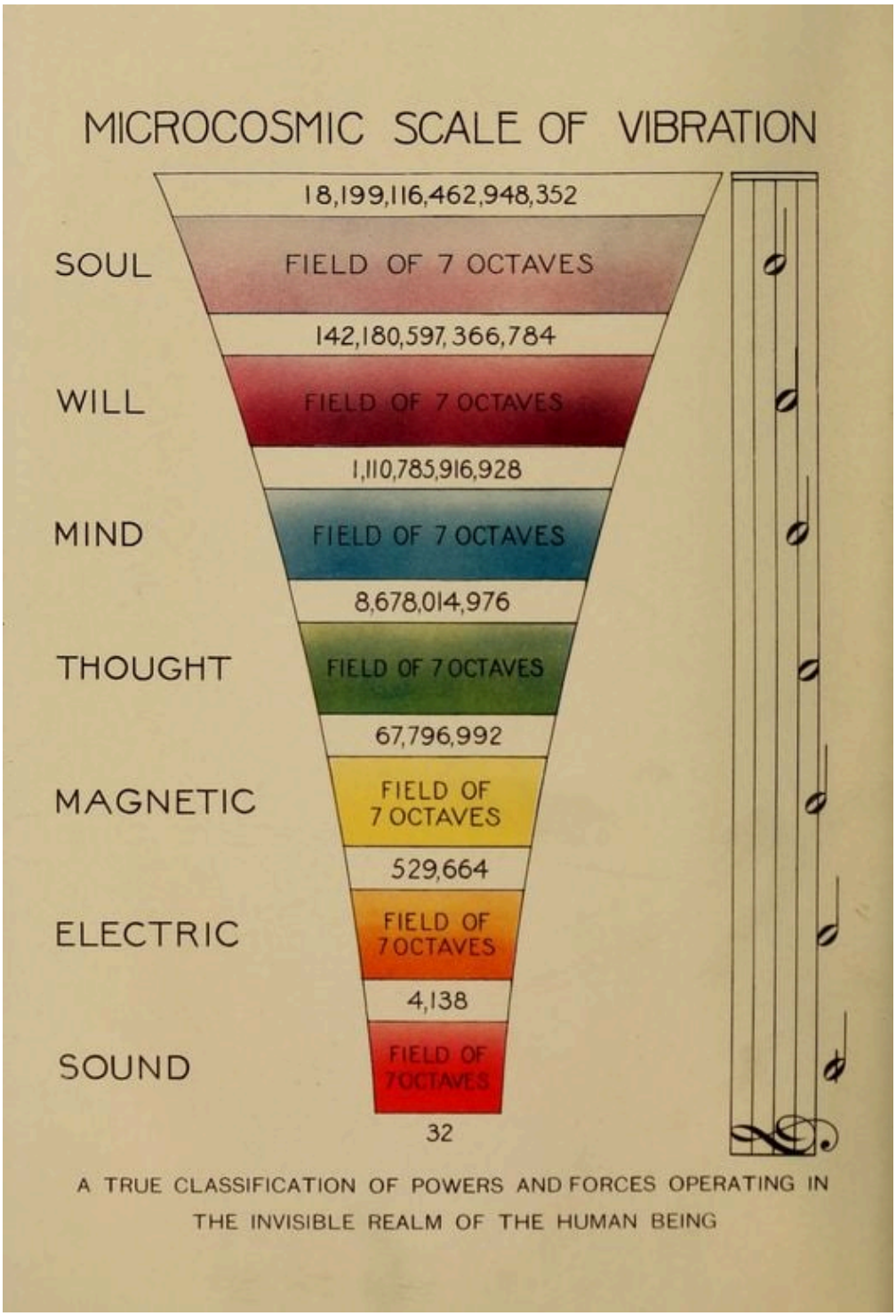
seven octaves



(click to enlarge)

Ramsay

The number 3 is the creative power in music, producing fifths, but it is under the control of the Octave prime - the number 2. It is the supreme octave which forms a boundary by making twelve fifths and **seven octaves** unite in one **note**. Within this horizon lies the *musical system* in its threefoldness - major, minor, and chromatic. [Scientific Basis and Build of Music, page 35]

The mathematical scales, if followed out regardless of other laws which rule in music, would read like a chapter in Astronomy. They would lead us on like the cycles of the moon, for example. In 19 years we have 235 moons; but the moon by that time is *an hour and a-half fast*. In 16 such cycles, or about 300 years, the moon is *about a day fast*; this, of course, is speaking roughly. This is the way seemingly through all the astronomical realm of creation. And had we only the mathematical ratios used in generating the notes of the scale as the sole law of music, we should be led off in the same way. And were we to follow up into the inaudible region of vibrations, we

should possibly find ourselves where light, and heat, and chemical elective motions and electric currents are playing their unheard harmonies; or into the seemingly still region of solid substances, where an almost infinite tremor of vibrations is balancing the ultimate elements of the world. Music in this case would seem like some passing meteor coming in from among the silent oscillations of the planetary bodies of the solar system, and flashing past with its charming sound effects, and leaving us again to pass into the higher silence of those subtle vibrations to which we have referred, having no infolding upon itself, no systematic limit, no horizon. But music is not such a passing thing. Between the high silence of these intense vibrations, and the low silence of oscillating pendulums and revolving planets, God has constituted an audible sphere of vibrations, in which is placed a definite limit of systematic sounds; ***seven octaves*** are carried like a measuring line round *twelve fifths*; and motion and rest unite in placing a horizon for the musical world, and music comes [Scientific Basis and Build of Music, page 39]

with her irrevocable proportions to measure his scales for him. The stars at the C of the first scale and at the B# of the last show the coincidence of 12 fifths and **7 octaves**. The number of B# is 3113 467/512; C24 multiplied 7 times by 2 brings us to the number 3072; these two notes in the tempered system are made one, and the unbroken horizon of the musical world of twelve twofold keys is created. The very small difference between these two pitches is so distributed in the 12 tempered scales that no single key of the 12 has much to bear in the loss of perfect intonation. [Scientific Basis and Build of Music, page 118]

Hughes

General remarks on the method of harmonies developing on all kinds of instruments, including the human voice
—Much paradox, but yet the scheme will admit of clear demonstration
—A musical note compared to a machine, the motive power not of our creation
—The imperfection of keyed instruments, from some notes acting two parts, attuned to the ideal of harmony within us
—Macfarren quoted on the echoing power of a cathedral attuning the Amen
—Why music as an art precedes painting
—Philosophers and mathematicians have only studied music to a certain point
—Every key-note a nucleus, including the past, the present, and the future; no finality in any ultimate
—The late Sir John Herschel's views on the musical gamut alluded to
—The imperfection of keyed instruments adapts them to our present powers
—The laws will be seen to develope the twelve major and the twelve minor keys in unbroken sequence and in harmonious ratio; to gain them in geometric order [as] keyed instrument should be circular, the **seven octaves** interlacing in tones a lower and a higher series, . 15 [Harmonies of Tones and Colours, Table of Contents1 - Harmonies]

The twelve major scales
—The term key-note employed in the ordinary sense of the musician
—The twelve key-notes, with the six notes of each as they veer round in trinities, are written in musical clef, and the scales added
—The reversal of the four and three of the key-note and its trinities in the seven of its scale
—The twelve keys follow each other seven times through **seven octaves** linked into the lower and higher series
—Keys mingled
—The modulating of scales, the eleventh notes rising to higher keys, ... 26 [Harmonies of Tones and Colours, Table of Contents2 - Harmonies]

The twelve keys, their trinities, scales, and chords, rising seven times through **seven octaves**, each thirteenth note octave of the previous twelve and first of the rising twelve
—Descending, ascending reversed
—Keys mingled
—The Pendulograph alluded to, . . . 28 [Harmonies of Tones and Colours, Table of Contents2 - Harmonies]

The modulating gamut
—One series of the twelve keys meeting by fifths through **seven octaves**
—Keys not mingled
—A table of the key-notes and their trinities thus meeting
—The fourths not isolated
—The table of the twelve scales meeting by fifths
—The twelve keys, trinities, scales, and chords thus meeting are written in musical clef
—The twelve meeting through seven circles, each circle representing the eighteen tones
—The keys of C and G meeting, coloured
—Retrospection of the various major developments, ... 29 [Harmonies of Tones and Colours, Table of Contents3 - Harmonies]

The twelve keys meeting by fifths, one series modulating through **seven octaves**, keys not mingled
—The twelve veering round, the intermediate notes not coloured
—The keys of A and E meeting the intermediate notes coloured in musical clef, ... 39 [Harmonies of Tones and Colours, Table of Contents3 - Harmonies]

The twelve major and the twelve minor keys written in musical clef
—First, the twelve major keys rising mingled as they develope seven times through **seven octaves**
—Second, one series of the twelve meeting by fifths, keys not mingled
—Third, the twelve minor keys mingled
—Fourth, the twelve minor key-notes and their trinities, the keys meeting by fifths in the line above the keys of the ascending scales, and in the line below the keys of the descending scales, 42 [Harmonies of Tones and Colours, Table of Contents3 - Harmonies]

In the diagrams the circles are not drawn as interlacing into each other, from the difficulty of representing them accurately as rising spirally in geometric progression. If we endeavour to realise the development of harmonies, both in geometric order, and at the same time advancing and retiring, as in musical clef, we must imagine a musician having the physical power of striking all the notes on a circular keyed instrument of **seven octaves**, linked to a lower series of **seven octaves**, and a corresponding series of **seven** higher. But in fact the depth of the lower series, and the height of the higher, are alike unfathomable to our present powers. C, the first note of the **seven octaves**, sounds the four lowest tones, F, G, A, B of the lower series; and B, the last and highest note of the **seven octaves**, sounds in its harmony C? and D# of the higher series of sevens. [Harmonies of Tones and Colours, The Method of Development or Creation of Harmonies3, page 17]

THE term "key" will now be employed in the ordinary sense of the musician, as a note which keeps all those other notes under subjection which do not belong to its harmony. A good ear requires that the first note struck should govern and regulate the rest, carrying on the intricacies of the key through the **seven octaves** ascending and descending. [Harmonies of Tones and Colours, Diagram IV - The Development of the Twelve Major Scales, page 26a]

The twelve key-notes, with the six notes of each as they veer round in trinities, are again written in musical clef, and the scales added. The key-note leads the scale, and, after striking the two next highest notes of the seven of the harmony, goes forward, with its four lowest, an octave higher. The seven of each harmony have been traced as the three lowest, thus meeting the three highest in three pairs, the fourth note being isolated. Notwithstanding the curious reversal of the three and four of the scale, the three lowest pair with the three highest, and the fourth with its octave. The four pairs are written at the end of each line, and it will be seen how exactly they all agree in their mode of development. Keys with sharps and keys with flats are all mingled in twelve successive notes. If we strike the twelve scales ascending as they follow each other, each thirteenth note being octave of the first note of the twelve that have developed, and first of the rising series, the seventh time the scales gradually rise into the higher series of **seven octaves** beyond the power of the instrument. Descending is ascending reversed. After the seven and octave of a scale have been sounded ascending, the ear seems to lead to the descending; but ten notes of any scale may be struck without the necessity of modulation; at the seventh note we find that the eleventh note in the progression of harmonics rises to meet the seventh.

For instance, B, the seventh note in the scale of C, must have F#. This point will be fully entered into when examining the meeting of fifths. To trace the scale of C veering round as an example for all, we may begin with C in Diagram II., and go forward with F, G, A, and B an octave higher. If the twelve scales were traced veering round, they would be found to correspond with the twelve as written in musical clef. [Harmonies of Tones and Colours, Diagram IV - The Development of the Twelve Major Scales, page 26a]

CHAPTER IX.

DIAGRAM VI.—THE TWELVE KEYS RISING SEVEN TIMES THROUGH **SEVEN OCTAVES**, AND FALLING BACK AGAIN.

"Painting has been called silent Poetry; Poetry, speaking Painting; and Architecture, frozen Harmony. The laws of each are convertible into the laws of every other."
[Harmonies of Tones and Colours, The Twelve Keys Rising Seven Times, page 28a]

IF we strike the twelve keys of harmonies in trinities, scales, and chords, as written in musical clef, beginning with the lowest C in the bass clef, this first development is linked into the lower series of **seven octaves** by the four lower tones sounded by C. If we follow with the twelve keys six times, at the seventh time they will gradually rise into the higher series. We obtain a glimpse of the beauty arising from musical notes in the Pendulograph. How exquisite would they be if they could be represented in their natural coloured tones! — as, for instance, the chord of the scale of C in red, yellow, and blue, with the six coloured tones rising from each, and harmoniously blended into each other. [Harmonies of Tones and Colours, The Twelve Keys Rising Seven Times, page 28a]

DIAGRAM VII.—THE MODULATING GAMUT OF THE TWELVE KEYS MEETING BY FIFTHS, ADVANCING OR RETIRING IN MUSICAL CLEF THROUGH **SEVEN OCTAVES**, AND VEERING ROUND, ASCENDING AND DESCENDING THROUGH SEVEN CIRCLES.

[Harmonies of Tones and Colours, Diagram VII - The Modulating Gamut of the Twelve Keys1, page 29]

The keys of C and G meeting are coloured, and show the beautiful results of colours arising from gradual progression when meeting by fifths. Each key-note and its trinities have been traced as complete in itself, and all knit into each other, the seven of each rising a tone and developing seven times through **seven octaves**, the keys mingled. The twelve scales have been traced, developing seven times through **seven octaves**, all knit into each other and into the key-notes and their trinities. The chords have also been traced, each complete in itself, and all knit into each other and into the key-notes, trinities, and scales. And lastly, one series of the twelve keys, no longer mingled, but modulating into each other, have been traced, closely linked into each other by fifths through **seven octaves**, three keys always meeting. Mark the number of notes thus linked together, and endeavour to imagine this number of tones meeting from the various notes. [Harmonies of Tones and Colours, The Twelve Scales Meeting by Fifths, page 31a]

The 12 Major Keys meeting by fifths through **7 octaves**; strike each Key-note, as having risen a fifth higher ascending, and fallen a fifth lower descending. [Harmonies of Tones and Colours, The 12 Major Keys Meeting by Fifths, page 31c]

Probably the lowest harmony which we have the power of partially hearing is A minor, rising in the lower series of **seven octaves**; C, its highest note, sounding the six tones of C, its major harmony, on our horizon of sound. The diagram begins with A, the second space of the treble clef, as most convenient for writing. [Harmonies of Tones and Colours, The Minor Harmonies, page 33a]

THE same laws are followed here as in the development of the major scales. In that of A, F, the sixth note, has risen to F#, in order to meet B, which has previously sounded. In descending, the seventh note, B, falls to B?, in order to meet F, which has also previously sounded. The notes, ascending or descending, always follow the harmony of their key-note, except when rising higher or falling lower to meet in fifths. We may here trace the twelve, the ascending scale sounding the fifth harmony higher than its key-note, and, in descending, sounding the fifth lower harmony. The four pairs of each scale are written at the end of the lines. If we strike the twelve scales as they follow in succession, the thirteenth note being the octave of the first, and leader of a higher twelve; having gained them six times, at the seventh they gradually rise (though beyond the power of a keyed

instrument) into the higher series of **seven octaves**, and again, in descending, they fall lower, and are linked into the lower series of **seven octaves**. Nine notes of any ascending minor scale may be struck without the necessity of modulating beyond the fifth harmony. For example, in the scale of A, its tenth note, C#, rises to meet the sixth note, which has previously sounded. In descending, E?, the eleventh note, meets B?, the seventh note, which has previously sounded. The scale of A may be traced veering round by reference to Diagram IX., beginning with A, and carrying the four lowest notes an octave higher, F rising to F# in ascending, B falling to B? in descending. [Harmonies of Tones and Colours, Diagram XI - The Twelve Minor Keynotes with the Six Note of Each, page 36a]

CHAPTER XVI.

DIAGRAM XIII.—THE TWELVE KEY-NOTES, WITH THEIR TRINITIES, SCALES, AND CHORDS, THE THIRTEENTH BEING OCTAVE, ARE REPEATED IN MUSICAL CLEF, RISING SEVEN TIMES THROUGH **SEVEN OCTAVES**, AND FALLING AGAIN.

[Harmonies of Tones and Colours, Diagram XIII - The Twelve Keynotes with Their Trinities, page 38a]

We may also examine the table of the twelve tones gained through **seven octaves**: the sharp or flat is written to each note, excepting in the keys as they unite in succession. Each key-note by fifths is seen to become a root of the fifth higher key-note: thus A becomes the root of E, and so on. In descending, each root of the fifth lower seven becomes the fifth higher key-note; the key-note D has G for its root, and so on. [Harmonies of Tones and Colours, Diagram XIV - The Modulating Gamut of the Twelve Minor Keys by Fifths1, page 39]

TO recapitulate from the beginning, observe, firstly, the twelve major key-notes as they have developed from within themselves in succession, six tones in trinities seven times through **seven octaves**, each thirteenth note being the octave of the first note of the twelve that have developed, and being also the first of the higher series. We may retrace all as still sounding their tones, the key-notes leading the ear to the six notes of each harmony, the keys with sharps and those with flats being mingled. The ascending and descending scales always agree in their harmonies with the key-notes and their trinities. [Harmonies of Tones and Colours, Diagram XV - The Twelve Major and the Twelve Minor Keys, page 42a]

Secondly, we have the one series of the twelve keys as they meet by fifths through the **seven octaves**. The keys are no longer mingled; the scales meet by fifths in the same keys and their trinities. [Harmonies of Tones and Colours, Diagram XV - The Twelve Major and the Twelve Minor Keys, page 42a]

Thirdly, the twelve minor keys as they develope in succession seven times through **seven octaves**, always sounding their major harmony in trinities, and, as with the majors, each thirteenth note being the octave of the first note of the twelve, and first of the following series, the keys all mingled. [Harmonies of Tones and Colours, Diagram XV - The Twelve Major and the Twelve Minor Keys, page 42a]

Fourthly, we have one series of the seven of each of the twelve minor keys meeting by fifths through **seven octaves**. The keys of the twelve ascending scales are written in musical clef above the former, and the keys of the descending scales below. The ascending scales sound the fifth higher harmonies than the key-notes and their trinities, and the lower scales the fifth harmony lower than the key-notes and their trinities. The three series follow out their keys in three successive series, and all meet by fifths. [Harmonies of Tones and Colours, Diagram XV - The Twelve Major and the Twelve Minor Keys, page 42a]

The same no longer mingled, meeting by fifths through **7 octaves**. [Harmonies of Tones and Colours, The 12 Major Keys as They Rise, page 42c]

DIAGRAM XIX.—The minor gamut modulating in the meeting of fifths throughout **7 octaves**. [Harmonies of Tones and Colours, Additional Diagrams, page 57]

The Minor Gamut modulating in the meeting of fifths through **seven octaves**. We may here trace the twelve, each fifth note becoming the higher key-note. But the sixth and seventh notes of the scale are discords. For example, in the key of A, the sixth note, F?, is a discord with the second note, B?; and the seventh note cannot be sounded as G# falling into the eighth, without being a discord with the third note, C?. No octave can be

sounded in the Minor Scale, as it has risen into the fifth higher key of E. [Harmonies of Tones and Colours, The Minor Gamut Modulating in the Meeting of Fifths61, page 65]

See Also

Laws of Music
octave
Scale of the Forces in Octaves
seven
twelve octaves